

**RADIOGRAPHIC NETWORK**

The invention relates to a device for transferring information which comprises a number of node elements. Such a device can be designated a network.

Each of the node elements has its own address so  
5 that information intended for that node element and information originating from that node element can be identified as being associated with that node element.

Networks, particularly those used for transferring digital information between computers, are generally  
10 known. These typically comprise direct line connections and/or switched line connections over which the information is transferred. The information is sent along the line connections in accordance with a specified protocol so that each of the node elements can  
15 make use of the information.

The laying of line connections is generally quite a costly business, particularly when these line connections have to be arranged between separate buildings. The line connections must then generally be  
20 buried in the ground.

This drawback is obviated in the device according to the invention as characterized in claim 1. This network according to the invention operates radiographically so that physical connections between  
25 the node elements are not necessary. A data signal is transferred from the one node element to another until the node element is reached for which the data signal is intended.

A further favourable development is characterized  
30 in claim 2. This prevents a data signal creating repetitive feedback in the device, whereby proper operation and rapid data transfer could be adversely affected. The data signal will spread through the

network like the rings resulting from a stone in water and be "quenched" at the edges of the network.

The device can be embodied such that a data signal is transmitted a number of times at intervals in order to ensure that it arrives at the intended destination. The measure of claim 4 is preferably applied herein. As soon as the node element from which the data signal originally comes receives the confirmation signal, repeated transmission of the original data signal can be stopped.

The original data signal sent by a node element is generated in the embodiment according to claim 5 by a data-generating device connected to the input/output member. The data-generating device thus provides the data which must be transferred to another location in the network. Using the radio transmitter the central processor unit then sends the data which is packaged in a particular protocol.

A node element can also comprise a data-processing device and data supplied via the network is then further processed by this data-processing unit.

The measure of claim 7 is preferably applied. The signal is hereby prevented from being able to run on, for instance as a consequence of a malfunction of one of the radio receivers.

The device according to the invention can be applied for mutual connection of a number of computers. A number of node elements can herein be applied which are used solely to pass on the data signal from one computer to another, particularly when the distance between the computers for mutual connection is greater than the range of any of the radio transmitters.

The radio receivers and radio transmitters suitably operate at a frequency and with a power such that no authorization is required therefor. A suitable frequency is therefore 433 MHz.

Instead of mutually connecting a number of computers, the network according to the invention can also be used in suitable manner to control the systems present in the vicinity from a central point at which a  
5 computer is arranged. These can be for instance indicator and alarm systems in factories and for instance homes for the elderly and nursing homes and culture systems in agriculture and horticulture.

Another suitable application is the control of  
10 systems in buildings, such as heating installations, lighting and the like. The device is applied particularly usefully here when these buildings are separate buildings such as for instance in bungalow parks. In this respect an application in glass  
15 horticulture can also be envisaged.

Another suitable application is as theft alarm system, wherein a number of individual objects have to be monitored. Yachts in a marina, transport containers at a storage depot and the like can be envisaged here.  
20 Each of the objects for monitoring, such as the yachts or the containers, is provided with a node element according to the invention, on the input/output member of which one or more alarm sensors are connected. The device can be embodied herein such that each of the node  
25 elements is periodically checked for proper operation in order to enable timely recognition of sabotage.

In systems wherein the device is used to control or monitor a number of separate buildings and/or objects, the central computer can also be used in mobile manner.  
30 As long as it is situated within the range of the radio transmitter of one or more of the node elements, data signals intended for this central computer and originating from this central computer will be processed correctly in the network. In the stated application for  
35 bungalow parks, the device can for instance be applied to monitor and control the installations in each of the bungalows. It is thus possible to monitor the proper

operation of the central heating devices in each of the bungalows, but also to remotely switch them on and off and adjust the thermostat thereof. When the bungalow is not occupied, the thermostat can for instance be set

5 remotely to a position at which freezing of pipes is prevented. It is also possible to set the thermostat to a comfortable value some time before the arrival of new guests, so that they arrive to find a pleasantly heated bungalow.

10 Mains power failure can for instance be detected in similar manner. Only one node element need generally be applied per bungalow. All desired information signals and controls can be performed via this node element.

The bungalows in a bungalow park are usually spaced

15 such that it is possible to suffice with one node element per bungalow to ensure a good transmission through the network. In the case of greater distances additional node elements can be incorporated.

Another example of the present invention is the

20 application in climate control in glass horticulture.

Within glass horticulture a system can be developed wherein, on the basis of diverse sensors (about 50 per hectare) in the glasshouse, a picture can be formed of the climatological situation in this glasshouse, such as

25 determining the temperature, relative humidity, CO<sub>2</sub> and so on.

For a uniform growth of the crop it is particularly important to provide a very uniform climate through the glasshouse.

30 According to the invention the differences can be detected and corrected with a network of sensors over the whole area of the glasshouse. Sunblinds, heating equipment and sprinkler installations are for instance actuated subject to the detected differences.

35 The pattern of sensors can be sub-divided into sub-patterns which each co-act with a node element in accordance with the network system of the invention. It

is further possible to group the sensors of the same type, for instance temperature, humidity and CO<sub>2</sub> sensors, which groups report to predetermined node elements, which data is transferred to the relevant computer.

5       The system according to the invention can be extended still further by applying remote mobile control elements or hand terminals which are carried by security or glasshouse personnel, which personnel can immediately report information relating to humidity or plant  
10 diseases. In this latter case the member of staff does not need to know his location in the glasshouse at that moment. The position determination can in any case take place with for instance the bar codes on the plants in order to obtain a more precise determination. A less  
15 precise position determination takes place as "cross-check", i.e. use is made of the high-frequency signal intensity generated by the hand terminal. This operates as follows:

When the signal from the hand terminal is received  
20 by a plurality of node elements, it is possible on the basis of the signal intensity to roughly determine the location at which the hand terminal is situated. The disease symptoms and the associated position determination reported by the hand terminal herein serve  
25 as reference data, for instance for a spraying machine for pesticides.

Other functions can be given to the hand terminals, for instance a timestamp, so that the activities performed by staff can be registered.

30       The manner in which the different sensors and control elements are connected to the input/output member of the node element and co-act therewith will be obvious to a skilled person in the field and requires no further explanation here.